TAXONOMIC NOTES ON COLOMBIAN DESMIDS*

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ABSTRACT. – From Colombia (South America) eight desmid taxa are newly described : *Euastrum labrys* spec. nov., *E. panamense* spec. nov., *Cosmarium mateyucense* spec. nov., *S. brachiatum* Ralfs forma *parallelum* fo. nov., *S. ceratophorum* Nordst. var. *multiplicatum* var. nov., *Staurastrum diabolo* spec. nov., *S. lapponicum* (Schmidle) Grönbl. var. *flaccum* var. nov., and *Xanthidium regulare* Nordst. var. *novangulare* var. nov. Of seven taxa the names are recombined or newly given : *Closterium guyanense* (Bourr. & Couté) stat. nov., *Pleurotaenium sceptrum* (Roy) W. & G.S. West var. *hexacanthum* (Grönbl.) comb. nov., *Euastrum guyanense* (Théréz.) stat. nov., *Cosmarium giganteum* (Théréz.) comb. nov., *Staurastrum foersteri* nom. nov., *S. latecurvatum* (Grönbl.) stat. nov., and *S. polytrichum* (Perty) Rabenh. var. *brasiliense* (Grönbl.) *comb. nov.* The name *Euastrum fittkaui* Förster is validated.

RÉSUMÉ. – Huit nouveaux taxons appartenant à l'ordre des Desmidiales sont décrits de Colombie. *Euastrum labrys* spec. nov., *E. panamense* spec. nov., *Cosmarium mateyucense* spec. nov., *S. brachiatum* Ralfs forma *parallelum* fo. nov., *S. ceratophorum* Nordst. var. *multiplicatum* var. nov., *Staurastrum diabolo* spec. nov., *S. lapponicum* (Schmidle) Grönbl. var. *flaccum* var. nov., and *Xanthidium regulare* Nordst. var. *novangulare* var. nov. Pour sept taxons les noms ont fait l'objet d'une nouvelle combinaison ou bien sont donnés comme nouveaux : *Closterium guyanense* (Bourr. & Couté) stat. nov., *Pleurotaenium sceptrum* (Roy) W. & G.S. West var. *hexacanthum* (Grönbl.) comb. nov., *Euastrum guyanense* (Théréz.) stat. nov., *Cosmarium giganteum* (Théréz.) comb. nov., *Staurastrum foersteri* nom. nov., *S. latecurvatum* (Grönbl.) stat. nov., *S. polytrichum* (Perty) Rabenh. var. *brasiliense* (Grönbl.) comb. nov. Le nom *Euastrum fittkaui* Förster est validé.

KEY WORDS : taxonomy, desmids, green algae, freshwater, Colombia, South America.

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INTRODUCTION

In the scope of the Dutch-Colombian co-operative project Ecoandes (HAMMEN et al., 1983) the author made a collection trip in Colombia in February-March 1985, aiming at the sampling of freshwater algae, especially desmids, from various climatic regions and ecological habitats. In total 135 samples were gathered from a fifty different localities[1]. Altogether some 450 desmids taxa could be identified[2]. Since there exist few reports on the desmids of Colombia, and these are limited to the montane habitat of the Andes (WEST, 1914; TAYLOR, 1935), most of the taxa found by the present author constitute new records for this country. Preceding a general study to the distribution patterns of these taxa (publ. in prep.) it appeared desirable to describe a number of new taxa and to recombine some names.

MATERIAL AND METHODS

The algal material, collected by means of a plankton net (mesh size 40 µm) or by squeezing out submersed waterplants, was studied in fixed condition (4 % formaldehyde). Electric conductivity (in µS/cm at 25°C) and pH of the water were measured electrometrically, usually at the same day of sampling.

The desmid taxa discussed in this paper are from one or more of the following localities :

Laguna Verde – mountain lake in the Eastern Andes, circa 60 km north of Bogotá, at an altitude of 3650 m. Conductivity 10 µS, pH 6.1.

Laguna Seca – pool along the road Zipaquira - San Cayetano near Laguna Verde, partly filled in with dense vegetation of *Isoetes spec.* and *Callitriche nubigena* Fass. Conductivity 40 µS, pH 5.5.

Laguna Agua Blanca – mountain pool at an altitude of 2850 m in the Eastern Andes, circa 2 km north-east of Laguna Guatavita (north of Bogotá). The pool is filled in with a dense vegetation of *Potamogeton natans* L. and *Utricularia obtusa* Sw. pH 5.9.

Laguna Mateyuca – tropical lowland lake situated in the savannas of the province of Meta, a good 20 km south-west of Puerto Lopez. Conductivity 11 µS, pH 5.5.

Laguna Flor Amarilla – lowland lake circa 7 km east of Lag. Mateyuca, adjacent to Lag. Mozambique. Conductivity 14 µS, pH 5.6.

Laguna Rancho Grande – lowland lake in the province of Meta, some kilometers south of Rancho Bravo, circa 40 km east of Puerto Lopez. Just like Lag.

(1) The collection is stored at the Hugo de Vries laboratorium in Amsterdam, while a duplicate collection is present at the Instituto de Ciencias Naturales, Bogotá, Colombia.

(2) A complete list can be supplied by the author.

Mateyuca and Lag. Flor Amarilla along the borders with luxurious vegetations of submersed water plants e.g. *Isoetes spec.* and *Eriocaulon spec.* Conductivity 7 µS. pH 5.4.

Cienaga de Perancho – watercourse in the National Park Los Katios, situated near the outlet of the Rio Atrato in the north-western part of Colombia, at the Panama border. Along the banks of the watercourse dense vegetations of *Pistia stratiotes* L; no submersed water plants. Conductivity 270 µS, pH 6.7.

TAXONOMIC DESCRIPTION AND DISCUSSION

Closterium guyanense (Bourr. & Couté) stat. nov. (pl. I, fig. 2)

Basionym : *Closterium lineatum* Ehrenb. var. *guyanense* Bourr. & Couté (BOURRELLY and COUTÉ, 1982, p. 259, pl. 6, fig. 7).

It is the opinion of the author that this taxon, described from French Guyana by BOURRELLY and COUTÉ (l. c.), with its small dimensions and wide apart standing striae, has but little to do with *Closterium lineatum* Ehrenb. and better could be given the status of a separate species.

Closterium guyanense, so far only known from French Guyana (see also THÉRÉZIEN, 1985, p. 61, pl. 11, fig. 7), was encountered incidently in sample nr. 90, from Laguna Mateyuca.

Pleurotaenium sceptrum (Roy) W. & G.S. West var. ***hexacanthum*** (Grönbl.) comb. nov. (pl. I, fig. 1)

Basionym : *Pleurotaenium tridentulum* (Wolle) W. West. var. *hexacanthum* Grönbl. (GRÖNBLAD, 1945, p. 11, pl. 2, fig. 34).

As is argumented by PRESCOTT et al. (1975) the epitheton *sceptrum* Roy has priority over *tridentulum* Wolle. Consequently H. Croasdale (in PRESCOTT et al., l. c.) recombined some infraspecific taxa of *P. tridentulum* known from North America. So far this was not done with var. *hexacanthum* Grönbl., a taxon in its distribution possibly restricted to South America.

In the Colombian samples *P. sceptrum* var. *hexacanthum* appeared very rare. Only in collection nrs. 89 and 93, from lakes Mateyuca and Flor Amarilla some specimens could be observed.

Euastrum fittkaui Förster ex Coesel (pl. I, fig. 6)

Lectotype : Pl. 8, fig. 10 in FÖRSTER (1969).

Although it is clear that FÖRSTER (l. c., p. 32) meant his fig. 10 as iconotype, being the only one figure accompanying the original description of *Euastrum fittkaui*, he did not mention it explicitly. Since from 1 January 1958 the indication of a nomenclatural type is obliged (Art. 37.1 I.C.B.N.) formally the name of this species was not validly published. By indication of a lectotype now the name in question has been validated.

Of *E. fittkaui*, so far only known from one locality in Brazil, the present author encountered but a single specimen, in sample nr. 90 (Laguna Mateyuca).

Euastrum guyanense (Théréz.) stat. nov. (pl. I, fig. 7)

Basionym : *Euastrum quadrilobum* Scott & Grönbl. var. *guyanense* Théréz. (THÉRÉZIEN, 1985, p. 157, pl. 16, fig. 6).

Synonym : *Euastrum bipartitum* Krieg. forma, in THÉRÉZIEN, 1985, p. 74, pl. 16, fig. 5.

The alga figured in our plate I : 7 very much resembles *E. quadrilobum* var. *guyanense* as described by THÉRÉZIEN (l. c.). However, classing this taxon as a variety of *E. quadrilobum* is not tenable because of the quite deviating shape of the apical notch - one of the most important criteria when differentiating within this genus. While *E. quadrilobum* as described by SCOTT and GRÖNBLAD (1957, p. 14, pl. 3, figs. 8-10) is marked by a sharp mediane incision in the convex apical margin of its polar lobe, var. *guyanense* Théréz. shows a polar lobe of which the apical margin is widely retuse, without a mediane incision. Moreover in var. *guyanense* the polar lobe is almost as broad as the basal part of the semicell as against a relatively much smaller polar lobe in the nominal variety of *E. quadrilobum*. Failing the description of *Euastrum* species approaching var. *guyanense* in its essential features, this variety has to be raised in rank to species level. There is no doubt that *E. bipartitum* Krieg. forma, as figured by THÉRÉZIEN (l. c.) belongs to this same species. It is also characterized by a very broad polar lobe with retuse apex, in which characters it is clearly distinct from *E. bipartitum* as originally described by KRIEGER (1932, p. 211, pl. 20, fig. 16).

E. guyanense was encountered as a rare species in the benthos of Laguna Flor Amarilla (collector nr. 92).

Euastrum labrys spec. nov. (pl. I, figs 4, 5)

Cellulae subrectangulares fronte conspectae rationem longitudinis pro latitudine 1.6 habentes, cum sinu profundo et clauso. Pars basalis rectangularis semicellularum parte apicale multo magis lata disiuncta est ab excavatione profunda. Pars basalis semicellulae latera leviter retusa ad hunc modum utrobique lobulis binis mucronatis habet. In summo parte apicale semicellulae excavatio profunda incrassatione notabile parietis externe marginata duos lobos polares granulis coronatos discernens. Sub lobis polaribus duos lobi subpolares perpendiculares binis spinulis magnitudine imparibus cum horizontaliter tum verticaliter divergentibus moniti. Insuper hae spinulae subpolares tam conspectu apicale quam conspectu laterale asymmetrice dispositae sunt. Regio medialis semicellulae scrobiculo magno ad centrum monita. Longitudo 45-49 µm, latitudo 28-30 µm, crassitudo 14-15 µm.

Holotypus : tab. I, fig. 5.

Cells in frontal view subrectangular in outline, 1.6 times longer than broad, with a deep, closed sinus. Semicells with a rectangular basal part by way of a deep invagination passing into a much broader apical part. Basal part of the semi-

cell body with slightly retuse lateral margins, each modeling two lobules furnished with a little spine. Apical part of the semicell at its upper margin with a deep mediane notch which is bordered outwardly by a prominent thickening of the wall and separates two polar lobules, each tipped with a whorl of granules. Beneath the polar lobules two squarely outwardly projected subpolar lobules, each furnished with two spines which are of different size and disposed in different planes, both horizontally and vertically. Subpolar spines in lateral and in apical view of the cell asymmetrically disposed. Mid region of the semicell with a large, central scrobicle. Cell length 45-49 µm, breadth 28-30 µm thickness 14-15 µm. Holotype : pl. I, fig. 5.

E. labrys is a characteristically shaped taxon, named after the form of the abruptly widened cell apices somewhat resembling that of a Kretensian double-axe. It was only encountered in Laguna Rancho Grande (rather frequently in sample nr. 101).

Euastrum panamense spec. nov. (pl. I, fig. 8, pl. II, fig. 1)

Cellulae fronte conspectae latitudine longitudinem fere aequante mediae fortiter constrictae. Sinus clausus vel parum apertus. Semicellulae forma variata trapeziforme ad truncato-pyramidale cum lobis sex atque latitudinem maximam margine superiore loborum basalium attingentes. Ad centrum tumor lata et plana, verrucis in concentricis circulis dispositis monita est. Proxima isthmo verruca singula dimensione majora sita est. Granula seriatim in lobis disposita sunt. Longitudo 78-85 µm, latitudo 72-82 µm, crassitudo 38-41 µm.

Holotypus : tab. II, fig. 1.

Cells in frontal view almost as broad as long. Sinus deep, closed or slightly opened. Semicells approximately truncate-pyramidal in outline, six-lobed, reaching their maximum breadth at the upper margin of the basal lobes and with a large, flat protrusion in the centre, decorated with concentric circles of large granules. Just below this protrusion one single supra-isthmial tubercle. The lobes ornamented with rows of smaller granules. Length 78-85 µm, breadth 72-82 µm, thickness 38-41 µm.

Holotype : pl. II, fig. 1.

This alga was found earlier by G.W. Prescott in Panama but identified as *Euastrum verrucosum* Ehrenb. (PRESCOTT, 1966, p.28, pl. 4, fig. 41). Indeed, *E. verrucosum* is characterized as one of the most variable of all the *Euastrum* (PRESCOTT et al., 1977). For instance some varieties are known with reduced or even absent lateral protrusions, as var. *dalbisii* Laporte (LAPORTE, 1931) and var. *reductum* Nordst. NORDSTEDT, 1880), in that aspect resembling the form under discussion. This might therefore be listed as *E. verrucosum* var. *panamense*. However, in view of the fact that this alga is different from typical *E. verrucosum* not only by its single protrusion but also by its supra-isthmial tubercle, the absence of granules in the region between central protuberance and lobes, and by its characteristically shaped, somewhat «shouldered» basal lobes, the author prefer to distinguish it at species level.

E. panamense was found by the present author in Cienaga de Perancho, in the north-western part of Colombia, at the Panama border. The sample in which the taxon not infrequently can be encountered (collection nr. 133) was gathered by squeezing roots of *Pistia stratiotes*.

Cosmarium giganteum (Théréz.) comb. nov. (pl. II, fig. 2)

Basionym : *Staurodesmus lobatus* (Börges.) Bourr. var. *giganteum* Théréz. (THÉRÉSIEN, 1985, p. 164, pl. 35, fig. 1).

The alga figured in our plate II : 2 owing to its large dimensions and characteristic shape belongs without any doubt to the same species as the alga described by THÉRÉZIEN (l. c.) from French Guyana under the name *Staurodesmus lobatus* var. *giganteum*. However, this species has nothing to do with *Staurodesmus lobatus* (syn. : *Cosmarium lobatum* Börges.) even nothing at all with the genus *Staurodesmus* Teiling, on account of the bifurcate processes as shown in our figure. THÉRÉZIEN (l. c.) describes *S. lobatus* var. *giganteum* as monospinous it is true, but the corresponding figure shows at the upper left angle of the cell an unmistakable initial to bifurcation. Since THÉRÉZIEN (1985, p. 126) records this taxon as «very rare», it is not impossible that the original diagnosis was based on but a few specimens with more or less reduced processes. To which genus this species must be designated is difficult to decide because of the artificial character of the genera *Cosmarium* Corda ex Ralfs and *Staurastrum* Meyen ex Ralfs between which our species in question seems to be in an intermediate position. The assignment to the genus *Cosmarium* is rather arbitrary, even if it is supported by a resemblance to *Cosmarium securiforme* Borge var. *brasiliense* Grönbl. (GRÖNBLAD, 1945) and to *C. subauriculatum* (West & West) var. *duplomajor* Woodhead & Tweed as interpreted by COUTÉ & ROUSSELIN (1975). These last mentioned species too are characterized by short bifurcate processes at the angles but otherwise they show a different, much flatter cell shape.

Cosmarium giganteum was found by the present author in Laguna Mateyuca and Laguna Flor Amarilla, situated in the savannas of the province of Meta. Both lakes harbour an extremely rich desmid flora in which *Cosmarium giganteum* quantitatively plays only a very modest role. Nevertheless some ten specimens could be studied (from collection nrs. 90 and 91). The dimensions appeared to vary more than stated by THÉRÉZIEN (l. c.), i. e. length from 150 to 200 µm and breadth from 140 to 144 µm.

Cosmarium mateyucense spec. nov. (pl. III, fig. 1, 2)

Cellulae fronte conspectae longitudine latitudine circiter sesquilongiore mediae fortiter constrictae. Sinus late excavata litterae formae V figuram habet. Semicellulae forma variata subcirculare ad ellipsoidea cum angulis basalibus late rotundatis atque sculptura granulis conicis gregatim tumoribus planis dispositis ornatae. Cellulae a vertice conspectae late ellipsoideae and fere circuliformes. Longitudo 172-205 µm, latitudo 100-130 µm, crassitudo 92-102 µm.

Holotypus : tab. III, fig. 2.

Cells in frontal view about 1.5 times longer than broad, with a deep median constriction. Sinus a wide V-shaped invagination. Semicells subcircular-elliptic, with widely rounded basal angles and a sculpture of conical granules forming a group at flat protrusions. Cells in apical view broadly elliptic to almost circular. Length 172-205 µm, breadth 100-130 µm, thickness 92-102 µm.

Holotype : pl. III, fig. 2.

Cosmarium mateyucense is a very characteristically shaped species, conspicuous by its large dimensions, deep median constriction and marked cell wall ornamented by groups of large, conical granules. In these characteristics there is a striking resemblance with *Euastrum goyazense* Först., described from the State of Goyaz, in Brazil (FÖRSTER, 1964, p. 356, pl. 11, fig. 1, 2). However in its outline our species does not show any *Euastrum*- like invaginations and apart from that it has a much lower breadth-thickness ratio than *E. goyazense* (i. e. circa 1.1 versus 1.8).

C. mateyucense was rather frequently encountered in collection nr. 90, a benthic sample from Laguna Mateyuca, with more than 200 desmid taxa being the richest habitat sampled during the author's collection trip.

Staurastrum brachiatum Ralfs forma ***parallelum*** fo. nov. (pl. III, figs 5, 6)

Processibus parallelibus ad convergentibus a forma nominata differt. Longitudo 16-18 µm, latitudo 36-44 µm. Holotypus : tab. III, fig. 5.

Differing from the type by parallel to converging processes. Cell length 16-18 µm, breadth 36-44 µm.

Holotype : Pl. III, fig. 5.

Though *S. brachiatum* is known as a very variable species morphologically (PRESCOTT et al., 1982) so far the position of the arm-like processes, known as diverging, seemed a constant character. The parallel to even somewhat converging processes as demonstrated in our material render the alga quite another habitus and also because no transitions were observed to cells of *S. brachiatum* «normally» shaped in this respect, a taxonomic separation at the level of forma seems to be justified.

S. brachiatum forma *parallelum* was met rather frequently in Laguna Verde (Eastern Andes), especially in the plankton of the open water (sample nr. 39).

Staurastrum ceratophorum Nordst. var. ***multiplicatum*** var. nov. (pl. III, fig. 3)

A varietate nominata spinis ternis omne angulo semicellulae impositis, alternantibus cum tribus spinis vertice semicellularum positis differt. Longitudo cum spinis 109-115 µm, sine spinis 76-82 µm, latitudo cum spinis 83-94 µm, sine spinis 52-55 µm.

Holotypus : tab. III, fig. 3.

Differing from the type by the presence of three spines at each angle of the semicell. In addition, furnished at the apices with three spines, alternating with the patterns of three spines at the angles. Cell length with spines 109-115 µm,

(without spines 76-82 μm), cell breadth with spines 83-94 μm (without spines 52-55 μm).

Holotype : Pl. III, fig. 3.

The original diagnosis of *S. ceratophorum* by NORDSTEDT (1877, p. 24, textfig. 3) indicates but three spines (one at each angle) per semicell. BORGE (1925, p. 38, pl. 4, fig. 13) described var. *duplicatum* characterized by an additional apical whorl of three spines. On the analogy of it var. *multiplicatum* is described, resembling var. *S. duplicatum* in its apical whorl of three spines but differing from it by the presence of three spines at each angle. Since the median one of the three spines at the angles is slightly superimposed with respect to the lateral ones, one can distinguish in fact three whorls of spines per semicell. The potential development of several parallel whorls of spines in *S. ceratophorum* makes clear that FÖRSTER (1969, p. 65) was not right in transferring the specific epitheton from *Staurastrum* Meyen ex Ralfs to *Staurodesmus* Teiling.

S. ceratophorum var. *multiplicatum* was, just like var. *duplicatum* only met in Laguna Mateyuca (not rare in sample nr. 89).

Staurastrum diabolo spec. nov. (pl. I, fig. 3)

Cellulae fronte conspectae longitudine latitudinem fere aequante mediae fortiter constrictae. Sinus late excavata litterae formae V figuram habet. Semicellulae subellipsoideae processibus subapicalibus brevibus late truncatis, singulis coronatis dentibus obtusis. Cellulae a vertice conspectae circulares novem processibus brevibus instructae. Longitudo 46 μm, latitudo 49 μm.

Holotypus : tab. I, fig. 3.

Cells in frontal view almost as long as broad, with a deep median constriction. Sinus a broad V-shaped invagination. Semicells sub-elliptical with a subapical series of short, broadly truncate processes, each tipped with a whorl of blunt teeth. Cells in apical view circular with nine short processes borded by blunt teeth. Length 46 μm, breadth 49 μm.

Holotype : pl. I, fig. 3.

Unfortunately, only a single specimen of *S. diabolo* was found (in sample nr. 90, from Laguna Mateyuca). Moreover the cell wall sculpturing could not be studied in greater detail because of the masking protoplasmic contents. In general the description of a new taxon on the basis of but a single specimen has to be dissuaded owing to the possibility of an aberrant form and because anyhow no indication about its morphological variability can be obtained. However in this special case it concerns such a characteristic, regularly shaped form, not at all resembling any known figure from desmid literature, that the above mentioned objections are outweighed.

Staurastrum foersteri nom. nov. (pl. III, fig. 4)

Synonym : *Staurastrum teliferum* Ralfs var. *lagoense* (Wille) Grönbl. in GRÖNBLAD, 1945, p. 31, pl. 14, fig. 292; *Staurastrum teliferum* Ralfs var. *groenbladii* Först. (FÖRSTER, 1964, p. 429, pl. 28, fig. 7).

The taxon figured by GRÖNBLAD (l. c.) under the name *Staurastrum teliferum* var. *lagoense* was quite rightly renamed by FÖRSTER (l. c.). For this taxon, in frontal view characterized by some marked horizontal series of spines, needs to be separated from *S. teliferum* forma *lagoense* described by WILLE (1884, p. 19, pl. 1, fig. 38) in a poor and meaningless way. However present author is of opinion that the taxon in question is not clearly related to *S. teliferum* Ralfs at all. For the last mentioned species is characterized by an ornamentation of spines concentrated in more or less concentric circles at the angles of the semicell (RALFS, 1848, p. 128, pl. 22, fig. 4) while the taxon figured by GRÖNBLAD (l. c.) the spines are not concentrated at the angles but distributed very regularly in three parallel series around the semicell. It seems justified to change *S. teliferum* var. *groenbladii* in rank and give it the status of a separate species. At species level the epitheton *groenbladii* cannot be used because SKUJA (1931, p. 17) described already another species under this name. That is why the taxon had to be renamed for the second time.

Staurastrum foersteri, up to now only known from South America, was frequently met in all samples from the tropical clear water lakes Mateyuca, Flor Amarilla, and Rancho Grande, in the province of Meta.

Staurastrum lapponicum (Schmidle) Grönbl. var. ***flaccum*** var. nov. (pl. IV, figs 4, 5)

Semicellulae a semicellulis varietatis nominatae angulis basalibus truncatis et leviter deorsum curvatis differunt. Longitudo 37-44 µm, latitudo 37-46 µm.

Holotypus : tab. IV, fig. 4.

Semicells differing from those of the type by truncate, slightly down-turned basal angles. Cell length 37-44 µm, breadth 37-46 µm.

Holotype : Pl. IV, fig. 4.

S. lapponicum var. *flaccum* occurred fairly abundantly in sample nr. 34 originating from Laguna Seca in the Eastern Andes.

Staurastrum latecurvatum (Grönbl.) stat. nov. (pl. IV, figs 6, 7)

Basionym : *Staurastrum lepidum* Borge var. *latecurvatum* Grönbl. (GRÖNBLAD, 1945, p. 26, pl. 10, fig. 217).

One of the main characters of *S. lepidum* var. *latecurvatum* as figured by GRÖNBLAD (l. c.) concerns the shape of the semicell body, which is more or less rectangular, distinctly broader than long. In this character, unfortunately not included in GRÖNBLAD's (l. c.) original diagnosis, var. *latecurvatum* deviates so clearly from *S. lepidum* as described by BORGE (1899, p. 30, pl. 2, fig. 45) that placing under this species does not seem to be justified. Besides, the illustration of *S. lepidum* in BORGE (l. c.), only one single semicell being figured, is rather poor and it is notable that there are no later mentions of the nominal variety of this species as against several records of var. *latecurvatum* (e. g. FORSTER, 1969; SCOTT et al., 1965).

The original figure of *S. latecurvatum* in GRÖNBLAD (l. c.) is more or less

intermediate to our figures 6 and 7. Accordingly, describing these different forms as separate infraspecific taxa does not seem advisable for the moment.

S. latecurvatum as illustrated in our fig. 6 was met rather frequently in the tropical lowland lakes Mateyuca and Flor Amarilla (especially in samples nrs. 89 and 90). The form illustrated in our fig. 7 appeared to be abundant in Laguna Agua Blanca, in the Eastern Andes (sample nrs 22 and 23).

Staurastrum polytrichum (Perty) Rabenh. var. ***brasiliense*** (Grönbl.) comb. nov. (pl. IV, fig. 3)

Basionym : *Staurastrum brebissonii* Arch. var. *brasiliense* Grönbl. (GRÖNBLAD, 1945, p. 24, pl. 9, fig. 198).

In shape and dimensions of cell body and spines and also in number and density of spine insertion Grönblad's taxon agrees much more with the diagnosis of *Staurastrum polytrichum* (as *Phycastrum polytrichum*) by PERTY (1852, p. 210, pl. 16, fig. 24) than that of *Staurastrum brebissonii* by ARCHER 1861, p. 739). As a matter of fact last mentioned diagnosis is rather concise and not accompanied by any illustration, giving rise to different conceptions of this species (see flora of WEST, WEST & CARTER, 1923, p. 62). Possibly the description of var. *brasiliense* by GRÖNBLAD (l. c.) was misdirected by that well known flora in which unfortunately the figures of *S. polytrichum* may be labeled as confusing (MESSIKOMMER 1935, p. 124).

S. polytrichum var. *brasiliense* appeared not uncommon in the samples of Laguna Mateyuca (especially in collection nr. 89) and Laguna Flor Amarilla (especially nr. 91). Less frequently it was met in Laguna Rancho Grande (n. 101).

Xanthidium regulare Nordst. var. ***novangulare*** var. nov. (pl. IV, figs 1, 2)

Semicellulae a semicellularis varietatis nominatae differunt corona apicale ex sex spinis consistente necnon corona mediale ex novem spinis consistente ut a vertice conspectae novangulares sint. Longitudo cum spinis 110-150 µm, latitudo crassitudo aequalis 103-115 µm.

Holotypus : tab. IV, fig. 2.

Semicells differing from the typical by having an apical whorl of six spines, a mediane whorl of nine spines, and by being nine-angular in apical view. Cell length (inclusive of spines) 110-150 µm; cell breadth (= cell thickness) 103-115 µm.

Holotype : Pl. IV, fig. 2.

While *Xanthidium regulare* as originally diagnosted by NORDSTEDT (1869, p. 231, with textfig.) in apical view is octangular, the later described var. *asteptum* Nordst. in Borge as well as a number of other taxa thought to be synonymous with that BICUDO and CARVALHO, 1969) are six-angular in top view. The apical view of the above described var. *novangulare* is in its rough outline almost circular so that it seems to concern rather a representative of the genus *Staurastrum* Meyen ex Ralfs than of *Xanthidium* Ehrenb. ex Ralfs. Nevertheless its relationship with *X. regulare*, owing to the overall agreement in habitus, is obvious.

The cell angles of *X. regulare* var. *novangulare* may be furnished with single stout spines or with furcate ones. Since it is a well known fact that the shape of spines in *Staurastrum* and *Xanthidium* species often concerns a polymorphic characteristic which can be influenced by the environment, better no taxonomic implications will be attended (see also FÖRSTER, 1974, p. 164, concerning the differences between *X. regulare* var. *asteptum* and *X. regulare* var. *pseudoregulare* (Borge) Bicudo & Carvalho).

X. regulare var. *novangulare* was met as an infrequently occurring taxon in Laguna Mateyuca (especially in sample nr. 88) where it showed spines of a remarkably ochreous colour, just like the spines of other large-shaped desmid taxa as *X. regulare* var. *asteptum*, *Staurastrum ceratophorum* Nordst and *Staurodesmus cornutus* (Wolle) Teiling, occurring in this locality.

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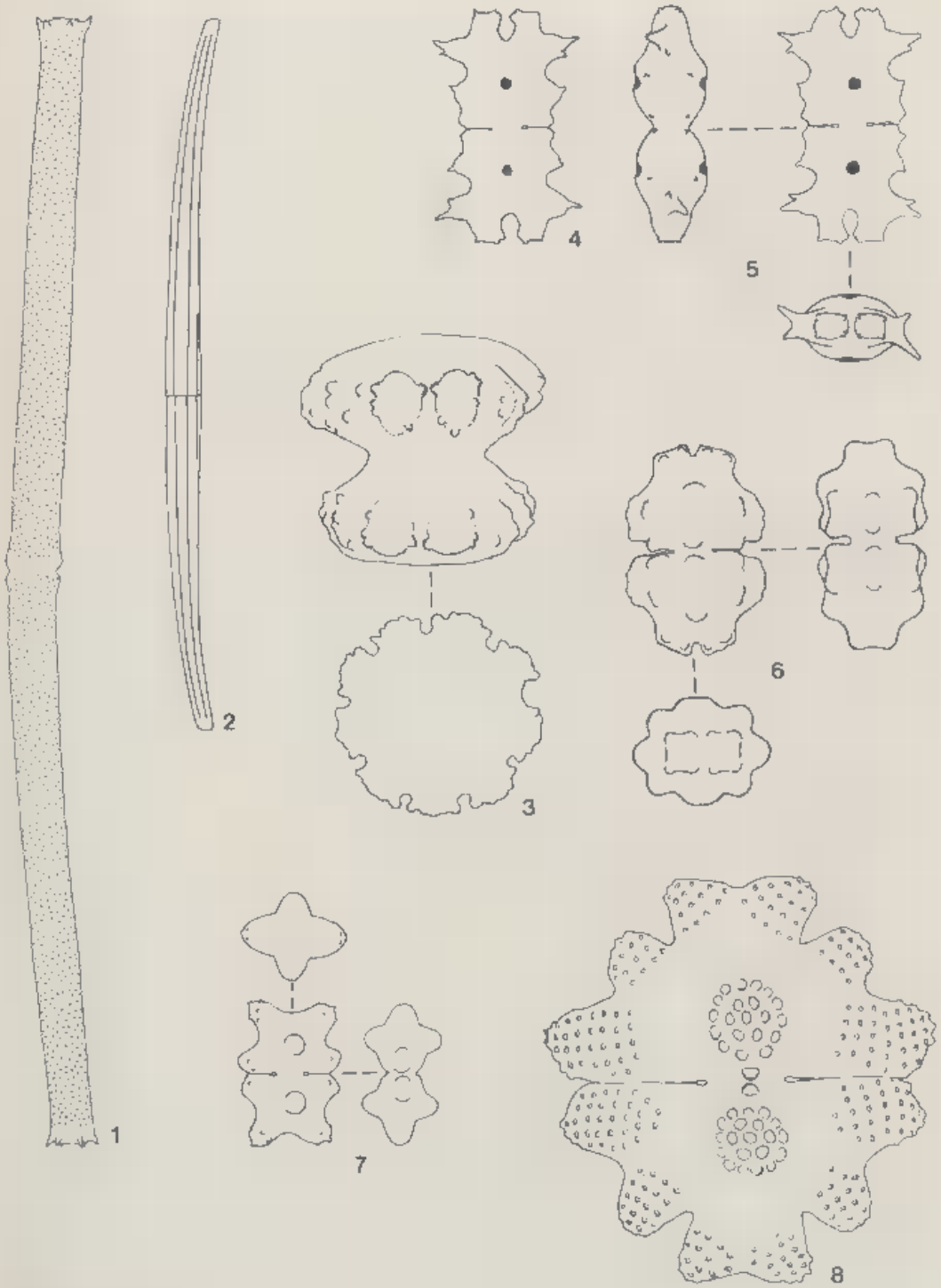

Plate I – Fig. 1 : *Pleurotaenium sceptrum* (Roy) W. & G.S. West var. *hexacanthum* (Grönbl.) comb. nov. Fig. 2 : *Closterium guyanense* (Bourr. & Couté) stat. nov. Fig. 3 : *Staurastrum diabolo* spec. nov.; both frontal and apical view. Figs 4, 5 : *Euastrum labrys* spec. nov. (fig. 5 both frontal, lateral and apical view). Fig. 6 : *Euastrum fittkaui* Förstet ex Coesel; both frontal, lateral and apical view. Fig. 7 : *Euastrum guyanense* (Théréz.) stat. nov.; both frontal, lateral and apical view. Fig. 8 : *Euastrum panamense* spec. nov. Scale bar represents 50 µm; scale a : figs 1, 2; scale b : figs 3, 4, 5, 6, 8; scale c : fig. 7.

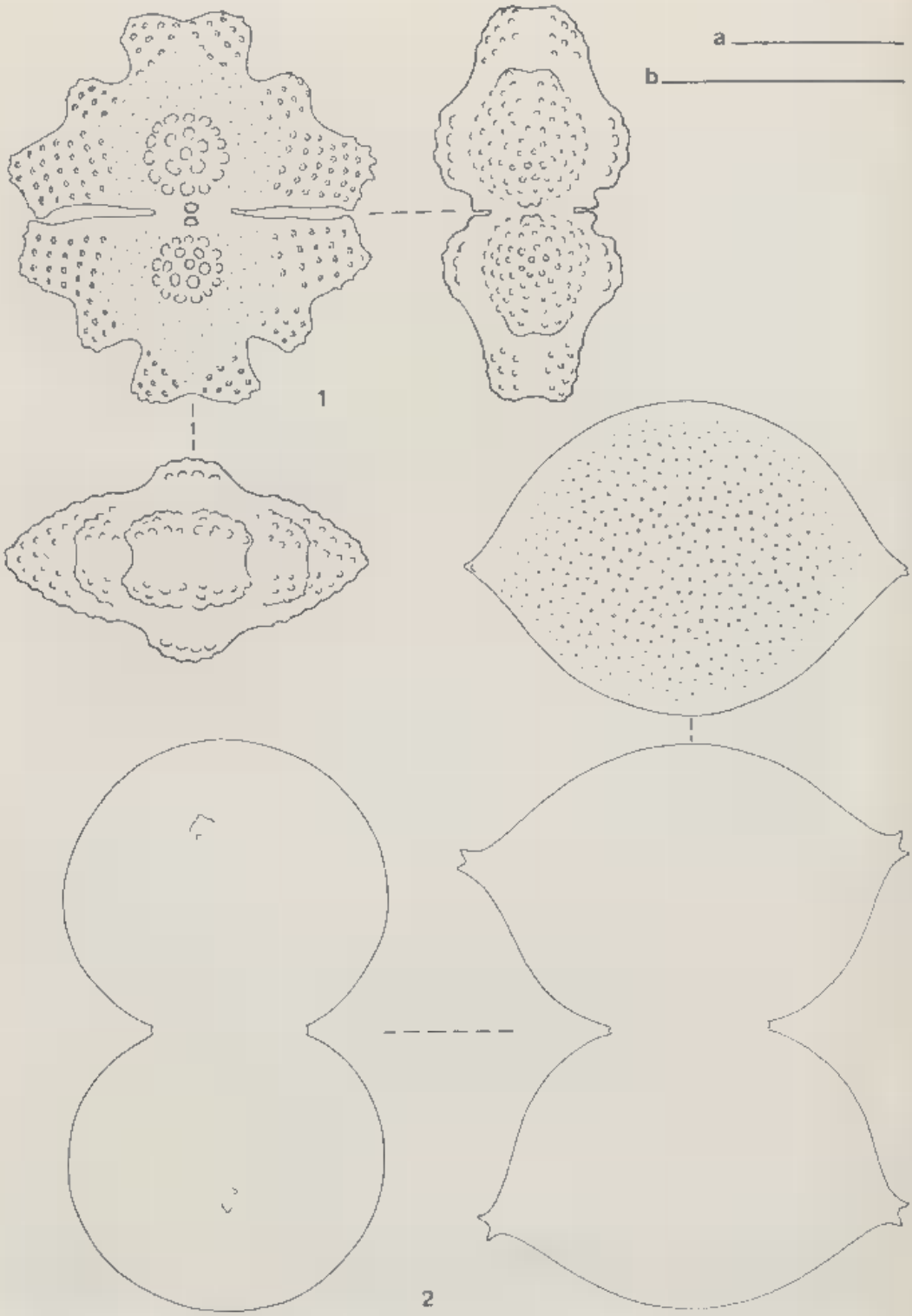

Plate II — Fig. 1 : *Euastrum panamense* spec. nov.; both frontal, lateral and apical view; cell wall punctuation only indicated in frontal view. Fig. 2 : *Cosmarium giganteum* (Théréz.) comb. nov.; both frontal, lateral and apical view; wall punctuation only indicated in apical view.
Scale bar represents 50 µm; scale a : fig. 2; scale b : fig. 1.

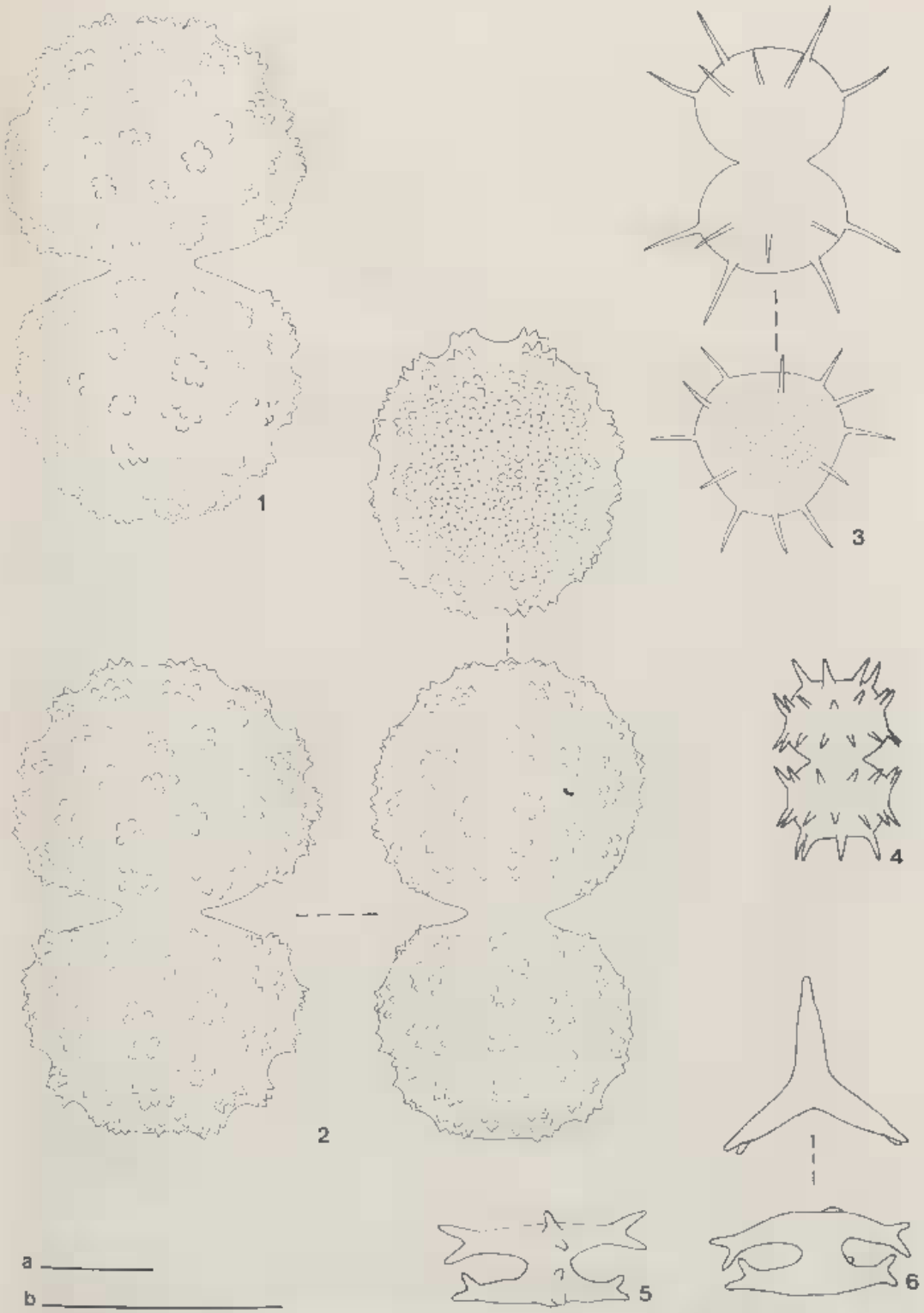

Plate III – Fig. 1, 2 : *Cosmarium mateyucense* spec. nov. (fig. 2 both frontal, lateral and apical view; cell wall punctation only indicated in apical view). Fig. 3 : *Staurastrum ceratophorum* Nordst. var. *multiplicatum* var. nov.; both frontal and apical view; wall punctuation only indicated in apical view. Fig. 4 : *Staurastrum foersteri* nom. nov. Figs 5, 6 : *Staurastrum brachiatum* Ralfs forma *parallelum* fo. nov. (fig. 6 both lateral and apical view). Scale bar represents 50 µm; scale a : figs 1, 2, 3; scale b : figs 4, 5, 6.

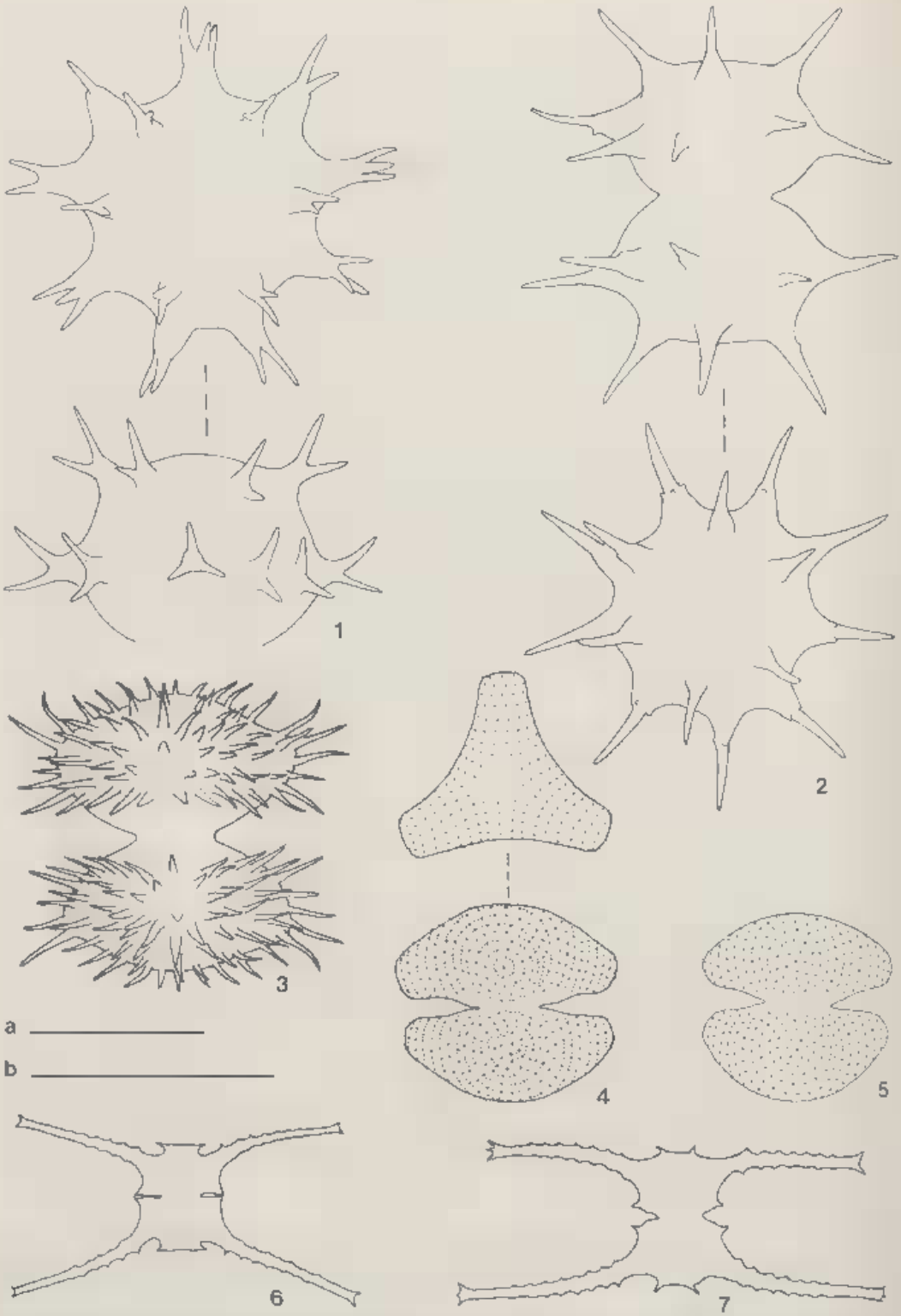

Plate IV – Fig. 1, 2 : *Xanthidium regulare* Nordst. var. *novangulare* var. nov.; both frontal and apical view. Fig. 3 : *Staurastrum polytrichum* (Perty) Rabenh. var. *brasiliense* (Grönbl.) comb. nov. Figs 4, 5 : *Staurastrum lapponicum* (Schmidle) Grönbl. var. *flaccum* var. nov. (fig. 4 both frontal and apical view). Fig. 6, 7 : *Staurastrum latecurvatum* (Grönbl.) stat. nov.
Scale bar represent 50 μm; scale a : figs 1, 2; scale b : figs 3-7.